

PATENT COOPERATION TREATY



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference B 14205.3 PR	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/FR2003/050179	International filing date (<i>day/month/year</i>) 16 décembre 2003 (16.12.2003)	Priority date (<i>day/month/year</i>) 17 décembre 2002 (17.12.2002)
International Patent Classification (IPC) or national classification and IPC H01L 23/544, 21/768		
Applicant COMMISSARIAT A L'ENERGIE ATOMIQUE		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 18 juin 2004 (18.06.2004)	Date of completion of this report 06 May 2005 (06.05.2005)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FR2003/050179

I. Basis of the report

1. This report has been drawn on the basis of (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

- ☐ the international application as originally filed.
- ☒ the description, pages 1-13, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____.
- ☒ the claims, Nos. 1-16, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____.
- ☒ the drawings, sheets/fig 1/9-9/9, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-16	YES
	Claims		NO
Inventive step (IS)	Claims	1-16	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-16	YES
	Claims		NO

2. Citations and explanations

1 Reference is made to the following document:

D1: US-A-5 952 694 (AKINO YUTAKA ET AL) 14 September
1999 (1999-09-14)

2 Claim 1 is not clear, therefore the application does not meet the requirements of PCT Article 6.

2.1 It is apparent from all the embodiments of the invention contained in the description (cf. page 10, lines 2-8 and corresponding figures 6 and 7, page 12, lines 8-14 and corresponding figures 19 and 20), and from the use of the expression "bonding layer", that the following feature is essential for the definition of the invention: after the structure is turned over, the first bonding layer is bonded to a transfer substrate.

As independent claim 1 does not contain this feature, the claim does not meet the requirement of PCT Article 6 in combination with PCT Rule 6.3(b), which specifies that an independent claim must contain all the technical features essential to the definition of the invention.

2.2 Furthermore, it is clear from page 10, lines 9-17 of the description and figure 9 that the steps of (a) etching the first bonding layer in order to form a second mark, (b) depositing a second pattern layer, (c) defining a second pattern by lithography, are all performed on the side of the thin film which was in contact with the substrate, that is, on the side opposite the transfer substrate. However, this feature is not clear from the wording of claim 1.

2.3 The description and the drawings have been taken into account in interpreting claim 1 for the purpose of the present examination.

3 Document D1 is considered to be the most relevant prior art. It discloses (cf. embodiment 14 described in column 15, line 64 to column 17, line 13, and in figures 21A-21E, 22A-22B, 23A-23E) a process for forming patterns 79, 84 aligned on either side of a thin film 1 by means of an alignment mark 3. During the process, the alignment mark is covered with a bonding layer 80. The subject matter of claim 1 differs from the method of embodiment 14 of D1 in that a second mark for aligning a second pattern on a second surface of a thin film is etched in the same place as a first mark etched and covered with a bonding layer, this first mark being used for aligning a first pattern on the first surface of said thin film.

The subject matter of claim 1 is therefore novel (PCT Article 33(2)).

The problem which the present invention is designed

to solve can therefore be considered that of providing a second mark (aligned with the first on the opposite surface), which is visible in order that the patterns on either side of a thin film can be aligned precisely.

The solution to this problem proposed in claim 1 of the present application is considered to involve an inventive step (PCT Article 33(3)) for the following reasons.

In the forming process described in embodiment 14 of document D1, alignment mark 3 is not visible on the surface of the thin film which was attached to substrate 70. In D1, unlike in the procedure of claim 1, the mark is detected through the thin film and there is no indication that would lead a person skilled in the art to carry out an additional step of etching in the thin film in order to form a visible alignment mark.

Embodiment 16 of D1 (described in column 17, line 25 to column 18, line 3 and by figures 25 and 18A to 18D) discloses an alternative process in which alignment mark 3 extends through the entire width of thin film 1. After the substrate 70 has been removed, the mark appears on the second surface SS of the thin film 1. The structure in figure 25 is similar to the mark formed according to claim 1, but the formation process thereof does not include an essential step of the present invention, that is of depositing a bonding layer for filling the alignment mark in order to obtain a levelled surface for bonding a support substrate. In embodiment 16 of D1 (cf. column 17, lines 41-44 and column 14, lines

23-31) the support substrate is bonded directly to the surface of the thin film, and therefore the lack of a bonding layer reduces the strength of the bond between the thin film and the support substrate.

A person skilled in the art could not have arrived at the subject matter of claim 1 by combining embodiment 14 with embodiment 16 of D1 without exercising inventive skill. Furthermore, none of the known prior art documents appears to provide any indication leading the person skilled in the art to change one of said embodiments of D1 in order to arrive at the subject matter of claim 1.

- 4 Claims 2-16 are dependent on claim 1 and therefore, as such, also meet the PCT requirements as regards novelty and inventive step.
- 5 Contrary to the requirement of PCT Rule 5.1(a)(ii), the relevant prior art disclosed in document D1 has not been indicated in the description, nor has this document been cited.

No document reflecting the prior art described on page 3, line 21 to page 4, line 6 has been cited in the description (PCT Rule 5.1(a)(ii)).